Response to Bingaman-Murkowski Clean Energy Standard White Paper

Center for American Progress

Submitted to the Senate Environment and Natural Resources Committee

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Setting a clear and stable goal to move America toward a cleaner energy future is essential in order to foster innovation, pursue a more sustainable economic growth model, and join the rest of the world in the global race to dominate clean technology markets. For this reason, the Center for American Progress applauds the committee's efforts in developing a clean energy standard.

In embracing this agenda, however, we emphasize that it is essential that such a policy builds a strong market for the lowest-emission, truly renewable energy technologies. First and foremost, that requires a specific target to ensure the growth of our cleanest electricity resources including energy efficiency, and wind, solar, geothermal, and other truly renewable electricity sources.

For that reason, we at the Center for American Progress recently recommended that an 80 percent clean energy standard include a requirement that 35 percent of America's energy needs will be met by truly renewable energy and energy efficiency by 2035. This internal goal within the clean energy standard will ensure the growth of strong markets for technologies such as wind, solar, sustainable biomass, incremental hydroelectric power, and geothermal energy, as well as the most effective solutions for reducing energy demand though energy efficiency. CAP believes strongly that such a target is essential for a strong and effective clean energy standard.

As an initial matter, we also encourage Congress and the Obama administration to ensure that any developing clean energy standard meets the following core principles:

- It must generate new, long-lasting jobs and grow the economy.
- It must effectively spur development and deployment of renewable energy and energy efficiency technologies.
- It must account for regional diversity in resources and electricity markets.
- It must be simple and transparent, and minimize costs.
- It must provide a floor not a ceiling for clean energy, strengthening and building on existing state leadership.

These five principles inform our more detailed responses to the white paper.

Finally, our research at the Center for American Progress has found that broad deployment of clean energy technologies will require three things: market demand, financing, and infrastructure. The clean energy standard is a very powerful demand driver, but there will still be challenges in meeting the financing and infrastructure needs of a clean energy future. The clean energy standard should be accompanied by a set of policies directed at financing and infrastructure.

Question 1.

- *Should there be a threshold for inclusion or should all electric utilities be subject to the standards set by a CES?*

A Clean Energy Standard will be most effective if broadly applied. Neither the risks associated with pollution from traditional energy sources, nor the benefits of moving to clean energy sources, discriminate based on arbitrary distinctions between utilities. Indeed, one of the primary

considerations the Center for American Progress makes in thinking about how to design a clean energy standard is that every American should have the opportunity to reap the positive rewards from clean energy. This principle argues for broad inclusion.

However, some utilities may face significant technical and market-based barriers to quickly deploying clean energy. For example, small utilities—those that sell fewer than 4 million megawatt-hours of power per year—may be at a disadvantage in meeting a clean energy standard because they lack the capital or market share to invest in such technologies. Instead of a blanket exemption, we recommend that these utilities either be exempted only in the early years of a program, or that they be given a slower transition period in which to comply with a CES. If such an exception is made, it's important that small utilities' consumers ultimately be served with the same amount of clean energy sources as other, larger utilities, and that small utilities not fall behind the rest of the economy in the race to a clean energy future.

- *Should any states or portions of states be specifically excluded from the new program's requirements?*

As stated above, neither the risks associated with pollution from traditional energy sources, nor the benefits of moving to cleaner energy sources, discriminate based on state borders. Indeed, one of the primary considerations the Center for American Progress makes in thinking about how to design a clean energy standard is that every American should have the opportunity to reap the health benefits and other positive rewards from clean energy. This principle argues for broad inclusion.

The Center for American Progress believes strongly that a true national standard is essential for strong market development. However, such a standard can allow for regional differentiation. Instead of adopting a policy that exempts states or portions of states from the standard, it will be better to allow state public utility commissions the opportunity to propose alternative strategies for implementation, where hardship can be demonstrated. These options could include reliance on a higher rate of energy efficiency relative to renewable energy, or reliance on a higher share of nonrenewable low-carbon energy resources.

- *How should a federal mandate interact with the 30 existing state electricity standards?*

The federal mandate should be designed in a way that fully supports the existing state renewable electricity standards. The state standards are driving significant investment in wind, solar, and other clean energy technologies and the federal law should not interfere with their progress. Broadly speaking, the appropriate role for federal clean energy policy is to set a floor, not a ceiling.

The precise interactions with state standards will be complicated, and the federal standard should strive to reduce that complexity and provide certainty for utilities and investors. Some areas to consider include overall targets, compliance timelines, definitions of "clean energy," and trading systems. Trading systems are especially important, as they have been contentious at the state level and vary widely across state programs.

Building a broadly integrated national market for trading will bring more capital investment to clean energy projects and tend to lower their costs, while these benefits may be traded off against reduced certainty on local economic development benefits.

Question 2.

- *On what basis should qualifying "clean energy" resources be defined? Should the definition of "clean energy" account only for the greenhouse gas emissions of electric generation, or should other environmental issues be accounted for (e.g. particulate matter from biomass combustion, spent fuel from nuclear power, or land use changes for solar panels or wind, etc.)?*

It's important to build a system that recognizes the specific benefits of truly renewable generation and energy efficiency, while also acknowledging the broader suite of technologies that are generally cleaner than our current generation portfolio. We propose a system that requires utilities meet an 80 percent by 2035 target with a combination of 35 percent renewable resources and 45 percent clean resources, as summarized in the table below.

Resource tier	**Eligible resources**	**Target**
Tier 1	Renewable energy and energy efficiency	At least 35 percent by 2035, with at least 10 percent coming from energy efficiency
Tier 2	Other clean energy (including natural gas, nuclear, and coal with carbon capture and sequestration)	Remainder of 80 percent target (up to 45 percent) by 2035

Truly renewable resources (which include wind, solar, ocean, geothermal, tidal and wave generation, biomass, landfill gas, incremental hydropower, hydrokinetic, and new hydropower at existing dams, as defined in the American Clean Energy Leadership Act of 2009) and energy efficiency have special benefits. These technologies generally produce no or little carbon dioxide pollution. They also reduce price volatility related to fuel costs, and they generate minimal waste. Investing in these technologies also benefits the innovation economy, which will have sizeable spillover effects on the rest of the economy, including revitalizing our manufacturing sector. However, experience shows that without designated treatment under a clean energy standard to provide a predictable market demand signal, roadblocks to developing these strategic resources will persist. Therefore, because of their significant benefits, the contribution of renewable electricity and energy efficiency should be given special treatment in a clean energy standard. We think that the best way to do this is for the standard to include a target of 35 percent for these specifically renewable resources by 2035.

The 45 percent remainder of the target could be met with a mix of these renewable resources and other forms of clean energy that reduce total carbon emissions but do not offer the full benefits of true renewables or energy efficiency. The definition of "clean" for the purposes of Tier 2 in our model should be crafted such that this tier includes those resources that have lower emissions

of particulate matter, mercury, carbon dioxide, acid rain precursors, and smog ingredients than traditional fossil fuels. Technologies that qualify under Tier 2 could include natural gas, nuclear power, and coal generation with carbon capture and storage technology that achieves an 80 percent reduction in CO2 pollution. The Environmental Protection Agency should have a role in determining which resources qualify for this part of the standard.

- *Should qualifying clean energy resources be expressly listed or based on a general emissions threshold? If it is determined that a list of clean energy resources is preferable, what is the optimal definition for "clean energy" that will deploy a diverse set of clean generation technologies at least cost? Should there be an avenue to qualify additional clean energy resources in the future, based on technological advancements?*

The American Clean Energy Leadership Act of 2009, which the Senate Energy and Natural Resources Committee passed with bipartisan support, included a renewable energy standard that clearly and cleanly defined "renewable" energy. This list of resources should be included in a clean energy standard for the Tier I, 35 percent requirement. These resources, along with energy efficiency, should be given special consideration that recognizes their unique benefits.

These technologies include wind, solar, ocean, geothermal, biomass, landfill gas, incremental hydropower, hydrokinetic, new hydropower at existing dams, incremental geothermal, coal-mined methane, and certain types of waste-to-energy. A great deal of effort has already gone into developing this consensus on definitions of renewable resources among stakeholders and key constituencies, and this work should form the foundation for developing a broader Clean Energy Standard.

The renewable resources that were included in ACELA provide price stability to consumers, reduce carbon dioxide and other pollutants, minimize harmful waste, and protect human health. Building these technologies will also revitalize America's manufacturing sector, a benefit that is essential for long-term economic health.

Because of these benefits, these truly renewable resources and energy efficiency should have an internal target of 35 percent by 2035 within the clean energy standard.

The rest of the standard can be met with a broader set of resources that are generally cleaner than our current generation portfolio. This includes resources like existing hydropower, natural gas, nuclear, and coal with carbon capture and sequestration. The Environmental Protection Agency should have a role in determining which resources qualify for this part of the standard.

- *What is the role for energy efficiency in the standard? If energy efficiency qualifies, should it be limited to the supply side, the demand side, or both? How should measurement and verification issues be handled?*

Often called the "first fuel," energy efficiency is generally the cheapest and cleanest energy resource available. Efficiency is a critical resource in our country's clean energy future, and must have a prominent place in any clean energy standard. For many utilities and many parts of the country, energy efficiency is the smartest and most immediate way to move away from traditional fossil fuel generation, while also reducing the overall cost of transition for the country and helping consumers lower their energy bills. Frequently, energy efficiency has a net negative cost—it will save utilities and consumers money.

All Americans should be able to capture these benefits, and both utilities and power users should be rewarded for making efficiency improvements. It makes sense to have utilities meet 10 percentage points of their clean energy standard commitment with energy efficiency. Our proposal is that utilities should meet at least 10 percent of their Tier 1 commitment to truly renewable resources through energy efficiency investments.

The Federal Energy Regulatory Commission recently recognized the role that efficiency plays in the electricity system. FERC ruled that demand response—a type of energy efficiency—should be paid the same amount as generation. (Technically, FERC's rule says that demand response should receive the locational marginal price in a wholesale power system.) This means that saving electricity is a substitute for generating it.

The American Clean Energy Leadership Act of 2009, which the Senate Energy and Natural Resources Committee passed with bipartisan support, included energy efficiency. Specifically, the bill helpfully defined how energy efficiency should be measured and monitored, and the Center for American Progress supports the Committee's actions in this area.

Unlike ACELA, which allowed utilities to meet up to 26.67 percent of their total renewable energy efficiency requirement with energy efficiency but did not set a minimum standard, we believe that utilities should achieve a certain minimum amount of energy efficiency in addition to renewable energy use, with the ability to increase the use of energy efficiency beyond that threshold in a CES based on regional market conditions. Efficiency is a unique resource that has undeniable long-term benefits for consumers, the environment, and the electric power system.

Measurement and verification tools are key to building a strong market for energy efficiency that serves as a durable utility grade investment. Federal legislation should provide clear standards defining the performance quality and evaluation of workers doing energy efficiency improvements, but states and the private sector should be given latitude in meeting those standards.

- *Should retrofits or retirements of traditional fossil-fuel plants be included in the standard?*

The average age of a coal-fired power plant in the United States is more than 30 years, and some are up to 70 years old. These old plants produce 73 percent of the carbon dioxide and other pollutants coming from the utility sector. A Clean Energy Standard that encourages the prompt retirement of the oldest, dirtiest, least efficient plants would benefit public health.

But if utilities replace these aging, dirty plants with new fossil fuel plants, this will tend to slow the nation's progress toward improving our energy security and diversity as we move to build a clean energy future. This is because the long-lived nature of these assets ensures that they will produce a large amount of pollution for many decades to come. Nonetheless, it is of course beneficial to replace old plants with something cleaner and more efficient. This general principle should be recognized and rewarded in a clean energy standard, even where older and inefficient power plants are replaced with super-efficient fossil energy.

On the other hand, it's important that the benefits be properly counted. Only the incremental improvement of switching from one plant to another should count toward the clean energy standard, and this improvement should not count for an unlimited amount of time. For example, if a coal-fired power plant that is five years away from its expected retirement date is replaced with a new, more efficient plant, the new plant should only get credit for the incremental improvement in emissions for five years.

Furthermore, only early retirements or retrofits that are not driven by other regulatory compliance should count in a clean energy standard. Both this issue, and the issue of how to count net emission reductions, should be explored further by the committee and Department of Energy experts to establish the actual formula for this accounting.

- *Should the standard be focused solely on electricity generation, or is there a role for other clean energy technologies that could displace electricity, such as biomass-to-thermal energy?*

Non-utility energy producers, such as major industrial establishments that use large amounts of process energy, can make an important contribution to moving our country towards a clean energy future by using renewable resources for their own energy needs, thereby displacing fossil fuels. They should be rewarded for this contribution under a clean energy standard. This is particularly important for large industrial consumers that have the opportunity to replace fossil fuel-based electricity with on-site generation of electricity and thermal energy through combined heat and power, waste heat recovery, and fuel switching to renewable resources. .

This is also an opportunity to engage industries that use renewable resources as a primary feedstock. For example, the pulp and paper industry, which is a leader in using biomass to produce on-site heat and power, could be concerned that a clean energy standard would increase utility demand for biomass, which would drive up costs for this sector's primary input. To compensate this type of industry, the clean energy standard should be designed to provide credit for clean energy produced by industrial users outside of utility generation.

Question 3.

- *Should the standard's requirements be keyed to the year 2035 or some other timeframe?*

2035 is a good target for the overall policy. This moves the country forward on a rapid timeframe, but provides sufficient time for utilities to make the investments necessary to meet the target. In addition to this long-term goal, it is also essential that the standard include near-term interim targets to provide certainty in market demand for early investments in the deployment of clean technologies.

- *What interim targets and timetables should be established to meet the standard's requirements?*

Interim targets and timetables should allow for compliance flexibility while providing a clear path forward. To achieve this balance, the standard could provide a timetable with targets at five-year intervals, steadily increasing over each interim period.

If there are interim targets for every single year, this could disadvantage large-scale projects or transmission-dependent projects, both of which can take years to plan and build. Broader intervals between targets gives these projects time to come online.

The interim targets should account for utility diversity. If every utility is given the same target, then either utilities that have not yet made investments in clean energy will have to ramp up very quickly, or utilities that do have significant clean generation will not have to make any new additions in the short term. To accommodate this diversity, utilities in states with the lowest clean energy penetration should be given lower targets in the early years, but they should steadily increase to reach the same target as the rest of the country in 2035.

We believe the standard should clearly include targets for both Tier 1 resources (renewable energy and energy efficiency) as well as the broader suite of clean energy sources that fall in Tier 2. Our proposal is that 35 percent of the target should be met with renewable resources and energy efficiency, and the remainder should be met by a mix of these resources and other clean energy sources. Both tiers should have clear interim targets and timetables.

In establishing a national CES bill, the committee has the benefit of strong precedent from successful state RES provisions. Lessons can be drawn from these existing standards in how to set clear interim targets and timetables for utility planners in meeting the overall policy goals, while still providing sufficient flexibility to allow diverse resources to be brought online cost effectively.

- *What are the tradeoffs between crediting all existing clean technologies versus only allowing new and incremental upgrades to qualify for credits? Is one methodology preferable to the other?*

All existing sources should count towards the target, in addition to new and incremental sources. This includes both truly renewable resources—such as those defined in ACELA, which would count as Tier 1 resources in our proposed clean energy standard structure—as well as other clean sources like existing nuclear plants—which would count under our proposed Tier 2. These existing clean energy providers make an important contribution to our energy portfolio and it would be unproductive to replace their facilities with new clean energy projects. Giving credit to existing facilities recognizes their value and ensures that utilities have an incentive to retire other, more polluting facilities first.

- *Should partial credits be given for certain technologies, like efficient natural gas and clean coal, as the president has proposed? If partial credits are used, on what basis should the percentage of credit be awarded? Should this be made modifiable over the life of the program?*

Energy efficiency and renewable energy have special benefits that make them unique from other clean energy sources. To recognize these benefits, the standard should include a separate target of 35 percent of power coming from these sources by 2035. We call these "Tier 1" resources in our proposed CES structure, in contrast to "Tier 2" resources, which include nonrenewable, but still clean, resources such as nuclear energy and natural gas.

Because these unique benefits of truly renewable resources (which include reducing rate volatility, lowering emissions of greenhouse gases and other pollutants, and minimizing waste, as well as contributing to the revitalization of our manufacturing sector) are given value through this tiered structure, there is no need for partial credits for these technologies. The remaining clean energy sources all have a mix of positive and negative attributes, and none necessarily deserves more or less credit than the others. Partial credits can also add a level of unnecessary complexity to the clean energy standard.

- *What would be the effect of including tiers for particular classes of technology, or for technologies with different levels of economic risk, and what would be a viable way of including such tiers?*

The clean energy standard should have a two-tiered system, recognizing the special benefits that some clean energy sources can provide. Tier 1 should be made up of the renewable energy resources defined in the American Clean Energy Leadership Act of 2009 and energy efficiency, while Tier 2 should comprise other clean energy sources. Our proposal is summarized below.

Resource tier	**Eligible resources**	**Target**
Tier 1	Renewable energy and energy efficiency	At least 35 percent by 2035, with at least 10 percent coming from energy efficiency
Tier 2	Other clean energy (including natural gas, nuclear, and coal with carbon capture and sequestration)	Remainder of 80 percent target (up to 45 percent) by 2035

Renewable energy and energy efficiency provide unique benefits, such as reducing rate volatility, lowering emissions of greenhouse gases and other pollutants, and minimizing waste, as well as contributing to the revitalization of our manufacturing sector. The standard should ensure these benefits are available to all Americans by requiring utilities to use these resources for at least 35 percent of their power by 2035. Within this internal target, utilities should also have to meet 10 percent of their power needs with energy efficiency, while meeting the remainder of the 35 percent with renewables.

The remainder of the target should be met with a mix of these truly renewable resources and a broader suite of clean energy resources, such as natural gas, nuclear, and coal with carbon capture and sequestration.

This tiered system recognizes the greater net benefit of some types of energy while also providing the flexibility, certainty, and simplicity that makes compliance easier for utilities.

The tiered system should also be reflected in all interim targets, so that there is a clear path forward for both Tier 1 and Tier 2 resources.

- *Should the same credit be available to meet both the federal mandate and an existing state standard or should a credit only be utilized once?*

Utilities should be able to use the same credits for both federal and state mandates.

It is illogical to require utilities to meet federal and state mandates with different credits. For example, by 2020, California utilities will have to meet a state mandate that 33 percent of their power come from truly renewable resources. Suppose a utility in California sells 10 million megawatt-hours of electricity in a year. To comply with the California mandate, it will have to submit renewable energy credits for 3.3 million megawatt-hours. In 2035, this utility will also have to submit clean energy credits for 80 percent of its sales, or 8 million megawatt-hours. If credits can only be used to meet either the federal or state mandate, the utility will have to submit credits for a total of 11.3 million megawatt-hours. The utility will have to purchase credits for clean energy above and beyond what it actually sells to consumers. The best way to avoid this scenario is to allow credits submitted for state standards to also be used to comply with the federal standard.

It is critically important that states be allowed to impose stricter standards than the federal policy in order to build strong regional clean energy markets. Utilities in these states should still be able to use the same credits to meet both state and federal policy.

Many of the existing state standards only include truly renewable resources, which are the same resources that qualify under Tier 1 of our proposal. Utilities in these states will be very close to meeting the internal target of 35 percent of their power coming from these resources, and will be minimally impacted by this provision of a clean energy standard.

We fully recognize that the precise interactions between state and federal standards will be complicated. The federal standard should strive to reduce that complexity and provide certainty for utilities and investors, while respecting the integrity of leading state renewable energy and energy efficiency policies that may seek more ambitions deployment approaches. Some areas of complexity include overall targets, compliance timelines, definitions of "clean energy", and trading systems across state boundaries. Trading systems are especially important, as they have been contentious at the state level and vary widely across state programs. The committee should explore options for addressing these complex challenges, and continuously monitor how the federal and state mandates interact in the future.

- *Should there be a banking and/or borrowing system available for credits and, if so, for how long?*

Banking and borrowing are tools that are designed to smooth the impact of steadily increasing interim targets. Banking and borrowing mechanisms are unnecessary under a clean energy standard that has broadly spaced interim targets (say, over five year time intervals).

Question 4.

- *How might a CES alter the current dispatch order of existing generation (such as natural gas-fired power plants), which has been driven by minimization of consumer costs, historically?*

Economic dispatch is a fundamental principle for operating the American bulk power system. By dispatching lowest-cost sources of power first, the utility system has provided the cheapest possible power to consumers. This practice has had enormous benefits for consumers.

At the same time, externalities—both positive and negative—are not counted in current dispatch systems. This means that the costs of some electricity generation are borne by society at large rather than by individual consumers. This is particularly true for electricity generated by coal-fired power plants. The National Academy of Sciences estimates that pollution from burning coal costs the United States $60 billion annually due to premature deaths, medical treatment costs, and lost productivity. These costs are borne by society at large rather than by the individual consumers of coal-fired electricity. It is essential that the federal government adopt a system that internalizes at least some of these costs, in order to foster and expand newer power sources.

- *Could different crediting and requirements than those proposed by the president be more effective in deploying clean technologies?*

Our research at the Center for American Progress has found that broad deployment of clean energy technologies will require three things: market demand, financing, and infrastructure.

The federal government must adopt policies that increase demand for clean energy. A clean energy standard is a very powerful demand driver and will be transformational for the electricity industry in the United States. Other policies currently being discussed in Washington will also help to drive demand for cleaner energy technologies. For example, later this year, the Environmental Protection Agency will release standards for carbon dioxide emissions from power plants. Requiring power plants to internalize these costs will help level the playing field for clean and renewable energy resources, making these options a more attractive investment.

In addition, a price on carbon dioxide pollution—either through a carbon tax or a cap-and-trade system—would provide a price signal that changes how investors allocate money to energy resources, leading to more money for investments in clean energy technologies.

Feed-in tariffs (also called Clean Local Energy Accessible Now, or CLEAN, Contracts), which provide a guaranteed price for power over the life of a clean energy project, have also been extremely successful across the world. Germany now gets 1 percent of its electricity from solar power—several times more than what we get in the United States—as a result of its ambitious feed-in tariff policy. The feed-in tariff has also enabled Germany to develop an entire solar industry, creating high quality domestic jobs in research and development, manufacturing, installation, and operations.

Because these demand-driving policies all work in different ways and achieve different ends, they are not mutually exclusive. A price on carbon pollution would be very important in helping utilities choose generation resources that are best for the environment. A feed-in tariff would provide certainty for clean energy project developers so they could more easily attract financing and build projects more quickly.

Complementary financing measures like loan guarantees and production or investment tax credits are also useful for increasing deployment rates and reducing consumer costs. Even if a clean energy standard is adopted, the committee should explore these other policies to ensure that investors continue to support clean energy projects.

The committee should also explore a second set of complementary policies, such as new rules on planning, siting, and paying for transmission lines, which can address the infrastructure needs of clean energy.

Question 5.

- *What are the anticipated effects on state and regional electricity prices of a CES structured according to the president's proposal? What are the anticipated net economic effects by region?*

More than 30 states have some sort of clean energy standard, most of which are focused exclusively on truly renewable energy. There is strong empirical evidence that these standards have not appreciably raised rates for electricity consumers. Michigan's Public Service Commission, for example, has concluded that, "There is no indication that the renewable energy standard or energy optimization standard have had any impact on electricity prices in Michigan." In Texas, wind power penetration has actually led to *lower* spot-market electricity prices, savings that ultimately get passed along to consumers.

In fact, many states have determined that their renewable standards have such strong economic benefits, and such relatively small consumer cost impacts, that they have raised the requirement for the proportion of state energy that must be met using renewable resources. These states recognize that the local economic development impacts from clean energy deployment flow through all sectors of the economy. For example, Colorado is now a hub of wind turbine manufacturing, which has created thousands of middle-class jobs for Coloradans.

Countless studies predict that a federal renewable electricity standard would have little impact on consumer prices. The Union of Concerned Scientists and energy consulting firm Wood Mackenzie both found that a renewable energy standard would lower rates for electric consumers by reducing demand for natural gas—and thus reducing the price of natural gas. Studies from the Energy Information Administration, Congressional Research Service, and Lawrence Berkeley National Laboratory all find that a well-designed federal renewable energy standard would have a minimal impact on electric rates.

These studies should be updated to account for new knowledge about the costs of generating power from all clean energy sources. Energy efficiency is almost always less expensive than generating electricity, no matter the generating technology, and will have a downward impact on electric bills. However, the economic benefits of energy efficiency are unlikely to be realized without the strong demand signal that would be provided by including efficiency in a federal CES. Costs for wind and solar power continue to decline, based on technological improvements and manufacturing efficiencies. And natural gas prices are at historic lows. At the same time, prices for oil and coal on global markets are predicted to face steady and significant increases in coming decades as economic recovery takes hold and as more consumers demand energy services in developing nations. When combined with the increased costs to utilities of complying with pollution controls on traditional generation plants that will require these utilities to internalize many currently externalized costs, the steadily declining costs for clean energy will deliver very substantial economic benefits to consumers.

- *What options are available to mitigate regional disparities and contain costs of the policy?*

Every region of the country has ample access to clean energy, including wind in the upper Midwest, hydropower in the northwest, solar power in the southwest, and nuclear and biomass in the southeast. However, a complex set of factors has led some regions to historically underinvest in clean energy generation. The clean energy standard should put those regions on a path forward, but should not unduly penalize them for starting behind the rest of the country.

To account for these regional differences, utilities in states that are well below the national average of clean energy usage should have lower initial targets in the early years of the standard. These targets should ramp up, so that these utilities' consumers ultimately are allowed to benefit from the same levels of clean energy as the rest of the country. State public utility commissions would be helpful partners in determining exactly how quickly this ramp up should occur.

Robust clean energy credit trading mechanisms can also smooth regional differences. These should be designed in such a way that they do not discourage local economic development, and do not lead to market manipulation by speculators.

- *What are the possible uses for potential ACP revenues? Should such revenues be used to support compliance with the standard's requirements? Should all or a portion of the collected ACP revenues go back to the state from which they were collected? Should ACP revenues be used to mitigate any increased electricity costs to the consumer that may be associated with the CES?*

We strongly believe that ACP revenues should be dedicated to speeding the nation's transition to a clean energy economy. Because the most effective mechanisms to drive this transition will vary by utility, state, and region, it makes sense to allocate ACP revenues to non-federal entities.

In particular, state energy programs, or SEPs, have the ability to affect change on the ground. ACPs should be given to SEPs for the express purpose of investing in renewable energy resources and energy efficiency—Tier 1 resources under our proposed structure. These distributions should be carefully guarded, though, since SEP funds are tempting targets for state lawmakers to raid in times of state revenue shortfalls. ACP revenues must not be used for anything other than clean energy investment and energy efficiency for low-income consumers.

The ACPs should be directed back to the states that house the utilities that initially generated the ACP funds, so that no state is a net winner or loser based on ACP distributions. These funds should not, however, be distributed back to the utilities themselves, which would defeat the entire purpose of the program.

- *Should cost containment measures and other consumer price protections be included in a CES?*

Experience at the state level indicates that clean energy resources can both stabilize and reduce consumers' electric bills. More than 30 states have some sort of clean energy standard, most of which are focused exclusively on truly renewable energy. There is strong empirical evidence that these standards have not appreciably raised rates for electricity consumers. Michigan's Public Service Commission, for example, has concluded that, "There is no indication that the renewable energy standard or energy optimization standard have had any impact on electricity prices in Michigan." In Texas, wind power penetration has actually led to *lower* spot-market electricity prices, savings that ultimately get passed along to consumers.

In fact, many states have determined that their renewable standards have such strong economic benefits, and such relatively small consumer cost impacts, that they have raised the requirement for the proportion of state energy that must be met using renewable resources. These states recognize that the local economic development impacts from clean energy deployment flow through all sectors of the economy. For example, Colorado is now a hub of wind turbine manufacturing, which has created thousands of middle-class jobs for Coloradans.

Countless studies predict that a federal renewable electricity standard would have little impact on consumer prices. The Union of Concerned Scientists and energy consulting firm Wood Mackenzie both found that a renewable energy standard would lower rates for electric consumers by reducing demand for natural gas – and thus reducing the price of natural gas. Studies from the Energy Information Administration, Congressional Research Service, and Lawrence Berkeley National Laboratory all find that a well-designed federal renewable energy standard would have a minimal impact on electric rates.

These studies should be updated to account for new knowledge about the costs of generating power from all clean energy sources. Energy efficiency is almost always less expensive than generating electricity, no matter the generating technology, and will have a downward impact on electric bills. However, the economic benefits of energy efficiency are unlikely to be realized without the strong demand signal that would be provided by including efficiency in a federal CES. Costs for wind and solar power continue to decline, based on technological improvements and manufacturing efficiencies. And natural gas prices are at historic lows. At the same time, prices for oil and coal on global markets are predicted to face steady and significant increases in coming decades as economic recovery takes hold and as more consumers demand energy services in developing nations. When combined with the increased costs to utilities of complying with pollution controls on traditional generation plants that will require these utilities to internalize many currently externalized costs, the steadily declining costs for clean energy will deliver very substantial economic benefits to consumers.

The clean energy standard will likely include a clean energy credit trading mechanism designed to smooth out regional differences in clean energy costs. While a perfectly robust trading system can certainly increase the economic efficiency of a clean energy standard, there are some downsides to overdependence on trading. Trading systems can increase the complexity of a clean

energy standard, and should be designed with simplicity in mind. A trading system should also be designed to limit any negative impact on local economic development. The clean energy standard will have much broader support if every American community has the opportunity to benefit from the manufacturing, installation, and operation jobs that result from a clean energy standard.

- *How much new transmission will be needed to meet a CES along the lines of the president's proposal and how should those transmission costs be allocated?*

The United States transmission grid is a remarkable engineering achievement, and has served the country well. However, the grid is aging and outdated, and does not reflect the needs of a 21st century electricity system. It must be strengthened to accommodate the clean energy resources that will power the future. One of the primary challenges in strengthening the grid is building new high-voltage transmission lines from new clean energy generation resources to load centers with electricity needs.

The most important thing that the committee can do to support clean energy infrastructure is to pass legislation that encourages the modernization and improvement of the electricity grid. This includes providing regulatory certainty about who plans transmission, who builds it, and who pays for these investments. The original version of the American Clean Energy Leadership Act of 2009 included language that would address these grid issues. This original language—not the amended language that ultimately passed out of the committee—should be included in legislation complementing any clean energy standard.

This legislation should specify that the costs of transmission should be allocated based on the "beneficiary pays" principle, with a definition of "benefits" that includes "public policy benefits." This is important because the benefits of clean energy deployment, such as a revitalized manufacturing sector and cleaner air and water, don't flow specifically to the traditional "beneficiaries" of transmission, when "benefits" is narrowly defined as being about reducing rates and increasing reliability. These broader benefits are real and carry economic value, and it is appropriate that the costs of new transmission be broadly allocated so that all beneficiaries pay.

There is a historical precedent for making this sort of national investment in infrastructure. For example, the costs of building the interstate highway system were broadly allocated across all taxpayers, with a relatively small portion paid by the direct users in the form of gasoline taxes. Our cost allocation proposal for transmission is much narrower than this historical example, since only beneficiaries will pay for this new infrastructure.

The Federal Energy Regulatory Commission is expected to issue a rule this year that includes this provision, but there are already signals that the rule will be challenged in Congress and in the courts. The committee should provide clarity on this issue by passing a law that enables broad cost allocation.

- *Are there any technological impediments to the addition of significantly increased renewable electricity generation into the electrical grid?*

Most states are on track to meet or exceed their existing state renewable electricity or portfolio standards. This clearly demonstrates that there are not technological impediments to expanded deployment of wind, solar, geothermal, and other renewable technologies.

The Department of Energy under President George W. Bush determined that at least 20 percent of our electricity could come from wind energy by 2030. This is nearly three-fifths of our proposed 35 percent Tier I requirement for renewable energy by 2035.

Energy efficiency should account for at least ten percent of each utility's renewable energy compliance target because it is a negative-cost resource that can be build today with no technical challenges.

There are other clean energy resources that have significant benefits to the electric grid. Hydropower, for example, is a dispatchable resource that can follow load variations. Geothermal is a high-quality, baseload power source. Electricity from biomass can also serve as both baseload and dispatchable power, similar to natural gas. Likewise, large scale concentrated solar collectors create predictable load sources that are easily firmed with inputs of natural gas to create extremely clean base load energy.

Distributed generation (i.e., generation that is connected to the distribution grid, not the transmission grid) has some significant and unique benefits to the grid. Distributed solar generation can strengthen very specific locations on distribution grids. In addition, distributed generation can save money by eliminating the need for new transmission lines, and by reducing demand for peak load generation. Distributed generation has been shown to produce a more resilient grid with less vulnerability to power outages and supply disruptions.

There are some technical challenges to massive deployment of variable resources. However, studies from government agencies and industry groups (such as the Utility Wind Industry Group) have found that the current electric grid can handle upwards of 20 percent wind penetration.

The clean energy standard should include an internal target of 35 percent of electricity coming from truly renewable resources and energy efficiency by 2035. There are no insurmountable challenges to incorporating this level of deployment using today's technologies.

Question 6.

- *To what extent does a CES contribute to the overall climate change policy of the United States, and would enactment of a CES warrant changes to other, relevant statutes?*

A clean energy standard will provide an important price signal that will lead to more deployment of clean energy technologies. Expanding demand for renewable and clean electricity technologies should lead to an examination of supply-side incentives. For example, a clean energy standard could eventually make certain tax incentives unnecessary. The committee should explore whether a predictable, slow phase-out of the investment tax credit and production tax credit for renewable energy resources might make sense in light of a robust clean energy standard, and perhaps include a specific target date for re-examining these incentives after the CES has been in place for a number of years. The phase out of renewable energy incentives should only move forward in parallel with the elimination of other market distorting subsidies for fossil fuels that today create an unlevel playing field for clean energy resources.

Such a policy shift could only be justified, however, if a CES included a designated Tier 1 standard to create specific market demand pull for truly renewable resources and energy efficiency. Without such a policy mechanism, a CES will not substitute for other market driving clean energy policies.

- *What are the specific challenges facing individual technologies such as nuclear, natural gas, CCS, on- and offshore wind, solar, efficiency, biomass, and others?*

Each of these technologies has unique challenges, and there are countless inefficiencies and barriers to all clean energy resources built into our current energy system.

Our research at the Center for American Progress has found that broad deployment of clean energy technologies will require three policy drivers: market demand, financing, and infrastructure. The clean energy standard is a very powerful demand driver, but there will still be challenges in meeting the financing and infrastructure needs of a clean energy future.

There are a number of immediate concerns that can be addressed in policies that are complementary to a clean energy standard.

Financing challenges:

- While the cost of renewable electricity technologies continues to decline, some of these technologies still face cost barriers. Government investment in research, development, and deployment, as well as government procurement of renewable electricity, will help drive down their cost curve.
- There are financing barriers to innovative technologies, especially renewable resources. A Clean Energy Deployment Administration, as in ACELA, could help overcome these challenges.
- Energy efficiency, while offering few technology barriers, faces significant market barriers in the form of split incentives, information failures in real estate markets, and lack of access to effective capital markets. A range of policies can support the development of a robust energy efficiency retrofit industry in the United States, including: expanding loan guarantees to cover energy efficiency resources, improving the 179-D tax benefit for commercial building retrofits, improving national energy standards and building codes, and development of incentives for undertaking retrofits as proposed in the HOME STAR and Building Star proposals and related tax and financing measures.
- Competitive power markets have generally been effective at providing low-cost power for consumers, but volatile wholesale electricity prices can create a disincentive for investment. A wind farm, for example, provides power at stable costs over a multidecade time horizon. Yet, if it sells that power on a competitive market, its revenues will vary widely. The committee should consider legislation that can fix this disconnect, including legislation like the Let the States Innovate on Clean Energy Act, sponsored by Senator Sanders, which allows states to implement CLEAN Contracts (which are also called "feed-in tariffs").

Infrastructure challenges:

- Domestic manufacturing capacity is limited for some technologies. Better understanding the current capacity of the domestic manufacturing sector to scale up and become

competitive in producing clean energy systems would help; a proposal such as the National Manufacturing Strategy Act would begin to address this need.

- In addition, many small and midsize manufacturers lack the capital to expand or retool to meet the needs of a growing clean energy market. Extension of the Advanced Energy Manufacturing Tax Credit would help to quickly solve this problem. This credit needs more funding to meet demand, as the original funds were quickly exhausted.
- Some resources, such as wind, solar, and geothermal, are geographically constrained, and are not necessarily available in areas near existing transmission lines. A clean energy standard should be complemented with policies to encourage new transmission construction. It's especially important to clarify that all beneficiaries (broadly defined) should pay for new clean energy transmission, which will allow for broad cost allocation.
- The electric utility sector workforce is undergoing a generational transition, as large numbers of experienced employees approach retirement. Funding for community colleges and other workforce development programs are critical to safely and efficiently deploying new generation resources, as well as upgrading transmission and distribution systems.
- Clean energy generators across the country have all had different experiences with interconnection procedures. These procedures vary by utility, state, and region. Providing certainty on interconnection would make deployment of clean energy much simpler.

- *Will the enactment of a CES be sufficient for each technology to overcome its individual challenges?*

No. A clean energy standard is necessary but not sufficient. It provides an important demand driver for clean energy resources, but it cannot, on its own, address all of the challenges that face specific technologies or electricity market structures. The clean energy standard should largely be neutral about supporting specific technologies while differentiating between truly renewable Tier 1 resources, and those Tier 2 resources that have benefits but are not purely renewable in nature. The committee should consider attaching complementary policies to the clean energy standard to help overcome barriers for specific technologies.

- *Should there be an examination of energy-connected permitting?*

New clean energy technologies may be deployed in different places than aging power generators. For example, there's little reason to site a coal-fired power plant on federal lands, but these same lands can be the perfect place to site a wind farm or a large solar array. As an even more extreme example, the clean energy future will require using the vast offshore wind resource that sits in our oceans, which have not traditionally been used for clean energy purposes.

Using new land and water resources for energy will require new permitting processes and rules. Already, offshore wind developers are finding that existing siting rules are inadequate for projects built offshore. The committee should explore specific challenges for offshore wind energy, including establishing mechanisms to ensure adequate consultation with existing users of ocean space such as fishermen, shippers, and the Department of Defense, and work to address these challenges in ways that are acceptable for all ocean users.

Similar issues arise with federal lands. The Administration has implemented an expedited permitting process for renewable energy projects on federal lands. The committee should explore how well this process is working—for renewable energy developers, for wildlife and other resources, and in terms of permitting the sites that have the best energy resources and the fewest conflicts—and specifically try to identify any challenges that can only be addressed through legislation.

Siting is especially important for transmission resources necessitated by the development of remote renewable energy facilities. The Senate Energy and Natural Resources Committee's original and unamended language on planning and federal backstops for transmission siting will provide an important tool for harmonizing renewable energy project development across complex jurisdictional boundaries.

- *Are there specific supporting policy options that should be considered for coal, nuclear, natural gas, renewable energy, and efficiency?*

The clean energy standard on its own will be a critical demand driver, and will lead to deployment of more renewable and clean energy. The standard will be met more quickly and at less cost if it is accompanied by a set of complementary policies. These include:

- A Clean Energy Deployment Administration, which was also part of the American Clean Energy Leadership Act of 2009, which passed out of the committee with bipartisan support.
- Legislation that specifically authorizes states to mandate wholesale power transactions at above "avoided cost." This fix is part of the Let the States Innovate on Clean Energy Act, which Sen. Sanders has sponsored, and would enable CLEAN Contracts in the United States.
- An Energy Independence Trust is a financing mechanism that could operate at very low-cost to the government.
- Extension of the Advanced Energy Manufacturing Tax Credit.
- Multiyear Extension of the Section 1603 Treasury Cash Grant in lieu of tax credit program.
- Converting Section 179(d) Commercial Building Tax Deductions into tax credits, and increasing the credit per square foot of retrofit.
- Mandatory disclosure of chemicals used in hydraulic fracturing, which would help to ensure that natural gas is truly "clean."
- Fully fund ARPA-E, which will lead to increased investment in research and development of new, ground breaking technologies
- The Energy Innovation Hubs Act, which establishes research centers targeted at new technologies that private sector R&D investment is not reaching.
- HOME STAR and BuildingStar, which provide rebates for energy efficient building retrofits.
- Transmission legislation, to clarify that the costs of new transmission should be broadly allocated, and speed the process for planning, citing, and building new transmission lines.
- Expanding section 17 loan guarantee programs to be accessible by energy efficiency projects.

In addition to these specific policies, the committee should explore ways in which the federal government can help harmonize regulatory regimes across states and regions.

- *What is the current status of clean energy technology manufacturing, and is it reasonable to expect domestic economic growth in that sector as a result of a CES?*

Clean energy technology manufacturing has grown in the United States in those places where demand has been most consistent, and in particular in those states that have a renewable energy standard in place. The American Wind Energy Association recently put out a report showing that strong demand across a number of states has led to investment not only in installation but also in manufacturing in those states. Altogether, the wind industry now boasts 20,000 manufacturing jobs across 42 states. This is a testament to the fact that where demand is strong, there are benefits to co-locating manufacturing and installation. This is true in any number of industries involving multiple component parts or complex final assembly—see the auto industry, for example.

Including energy efficiency in a clean energy standard should have a particularly positive impact on American manufacturing, given that 90 percent of the manufactured goods used in energy efficiency improvements are made in America. A standard that makes clear that the United States is committed to continually improving our residential, commercial, and industrial efficiency will drive demand for these products, leading to existing firms expanding and the introduction of new firms.

However, the reverse is also true: where demand is low or irregular, it is extremely difficult for manufacturers to stay in business. We have already seen this principle in action in the United States. Already we have seen cutting-edge solar power manufacturing companies begin to close their doors, either permanently or to move to other countries with strong and dedicated clean energy markets. Evergreen Solar Inc., for example, recently announced plans to close its Massachusetts plant to put more funds into solar panel manufacturing in China. The company followed on the heels of SpectraWatt Inc. in New York and Solyndra Inc. in California closing some of their facilities. As General Electric Co.'s Chairman and Chief Executive, Jeff Immelt, said at last year's ARPA-E summit, those countries with strong demand for renewable energy products will naturally pull these companies into their borders because "innovation and supply chain strength gets developed where the demand is the greatest."

The fact is that the United States is still a strong manufacturer and exporter of a variety of products, in particular those where skilled labor and advanced manufacturing are at a premium. Energy industries rely on exactly the kind of large, complex systems that we have always excelled at manufacturing here at home. Furthermore, energy industries rely on continuous innovation and advancement to keep prices down and productivity up, and this kind of process improvement is best achieved where invention, design, and manufacturing are all co-located. But without a strong market pull for final products, such as the pull that would come with a CES, there is no reason for that innovation or manufacturing to stay here at home—especially when there is such a strong market pull coming from consumers overseas in Europe and Asia.